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ABSTRACT

This guide was compiled to help teachers and students locate free educational materials (both lessons and nontechnical background references) on renewable energy resources and energy conservation. The 214 entries are arranged by these topic areas: (1) energy efficiency and renewables; (2) biomass; (3) hydropower; (4) solar thermal energy; (5) photovoltaics; (6) geothermal energy; and (7) wind energy. Entries are grouped within these topic areas, when applicable, by such categories as background information, periodicals, or lessons. Each entry includes a description, source, and a code to a grade level/subject area matrix. The seven subject areas are cross-referenced by grade levels (K-3, 4-6, 7-8, 9-12, and adult) in the matrix. Although all grade levels are featured, the majority of materials available are targeted for high school students and adults. A separate listing of all sources cited is also provided. It is recommended that these sources be contacted for additional materials available, since several of them offered too many publications to be included in this guide. (JN)

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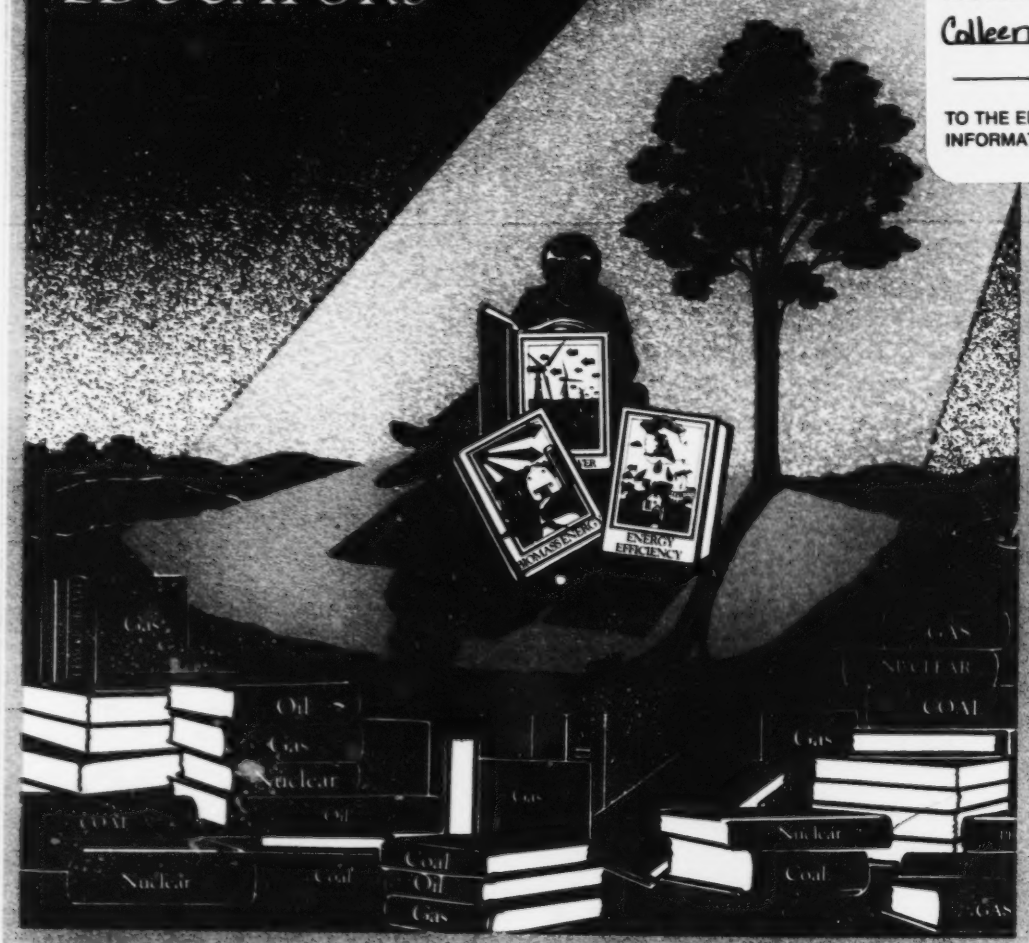
ALTERNATIVE ENERGY:

A GUIDE TO FREE INFORMATION FOR EDUCATORS



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CENTER FOR RENEWABLE RESOURCES

Expanding Energy Options

This directory echoes the Solar Energy Research Institute's (SERI) Solar Energy Locator, published light years ago in 1980, and it reflects the dramatic changes of the last five years. Many established sources of public information on renewables and conservation have ceased to offer their materials without charge because of tight budgets or altered priorities. Some sources found in the SERI listing simply do not exist any longer. And the federal government, often a source of voluminous and authoritative free information, no longer leads in either extent or superiority of information on the new energy technologies.

Not only is free information on conservation and renewables valuable because it is becoming scarce; free information brings the concepts and mechanics of the new technologies to an audience much wider than the technical elite. Furthermore, this free information is fueling public debate at a critical time, a time when awareness of energy problems is low, when the contributions of the new sources are beginning to show, and when the opportunity is at hand to make a firm commitment to a renewable and resilient energy future.

Free information is as vital to education as it is to the young alternative energy industries. Teachers need free access to high caliber information to deepen their lessons on technology (be those in science, social studies, mathematics or language arts), to support efforts to shape a scientifically astute public, and to balance the popular picture of renewables' potential with an accurate assessment of their current contributions.

The more people know the better they do in a changing situation. It is essential for people to be prepared for the inevitable transitions from a consuming to a sustainable society—from affluence to elegance.

We recognize that education is difficult. It is easier to promote a single idea, expecting a certain outcome. Education is also a risk. Teaching people "how" instead of "what" to think doesn't guarantee the outcome. But you can rely on thinking people to make wiser decisions in the face of transitions and future uncertainties. Our static sense of expectations has to give way into a dynamic world view that provides for the unforeseeable.

That is what education is about and that is why we have taken this first step to share new informational resources.

We depend on teachers to offer this information to their students. We depend on parents to encourage their children to explore new options to create a sustainable energy future. We hope this directory will help teachers and parents find what they need and ease their task.

Other energy policy makers may be able to locate sources of useful information within these pages. We welcome all comments and suggestions for improving this listing of free material. If the publication proves useful, with your help we will seek to update and improve the contents on a periodic basis.

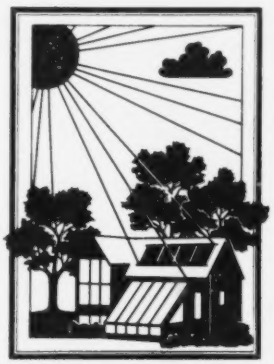
Tina Hobson
Executive Director
Center for Renewable Resources

ALTERNATIVE ENERGY

A Guide to Free Information for Educators

by
Janet A. White

Energy Efficiency and Efficiency & Renewables (General)
4-13



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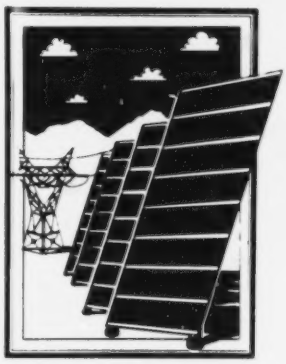

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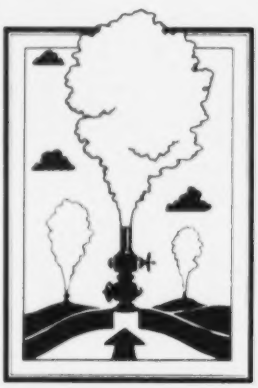

Geothermal
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How to Use this Book

This directory was compiled to help teachers and students find free educational materials--both lessons and nontechnical background references--on renewable energy resources and energy conservation. Although materials designed for instructional purposes are easiest to use in the classroom, the usefulness of other publications should not be underestimated. The do-it-yourself plans and manuals make good resources for science fair projects and school energy conservation programs. Background materials provide information around which to structure lessons or give examples with which to infuse energy into the study of, let's say, earth science. These same background readings can support research reports and other independent study projects. And any of these publications can serve as a model for your own materials development efforts.

Despite the length of this list, it is not exhaustive. Price was the parameter that most often disqualified materials. For this reason, some standard curricula and references will not be found here. A few materials were plainly unacceptable, most often because of the date of publication. Pieces published before 1980 generally were excluded.

Some materials were repetitive. For example, most state energy offices offer brochures, booklets, and/or guides on weatherstripping, energy conservation tips for the home, and solar domestic hot water. Background materials containing similar information with similar purposes have been combined into one or two entries, or have been noted in the source list with the phrase, "Other publications available."

Some sources offered too many publications to include. For example, the California Energy Commission has more than 300 publications, many of which could be useful to students of the renewable age, but not all of which could be listed here.

This directory also does not exhaust the resources offered by trade and professional associations, business and industry organizations, electric utilities or even state governments. States often delegate responsibility for various energy programs to departments other than the state energy office. For example, conserving energy in transportation may well be handled by the transportation department rather than the energy office in your state. Each person using his/her own logic can track down more information on a particular topic from appropriate groups.

Electric utilities comprise a large and often overlooked source of educational materials. As an industry in the thick of energy transitions, many utilities leave the hard sell out of their classroom materials and collaborate on programs that meet teacher's needs. Catalogs of educational services are generally available, and most utilities offer consumer information on energy conservation.

These entries are arranged by topic to correspond with the first booklet in this series, Renewable Energy at the Crossroads. To aid the teacher who doesn't have time to consider the full range of materials listed, a grade level/energy topic matrix has been constructed. A glance at the matrix shows that the bulk of materials in this directory are appropriate for advanced students and adults. This bias results partly from including public information publications which are designed for that audience. The lower grades have not been forgotten, however; high quality resources for young students can be found here as well.

No matter what grade you teach, this directory can help you locate materials to establish or support your program, and can serve as a jumping off point for further research--by students or teachers.

Grade Level/Subject Area Matrix

	K-3	4-6	7-8	9-12	ADULT
ENERGY EFFICIENCY	1, 7, 8, 11, 14, 16, 33	1, 3, 7, 8, 9, 13, 14, 33	2, 6, 7, 9, 10, 13, 23, 42, 51, 56	2, 4, 5, 6, 7, 9, 10, 12, 13, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59	2, 13, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 59
GENERAL CONSERVATION & RENEWABLE SOURCES	60, 61, 62, 68, 73, 74, 75, 82	60, 61, 62, 67, 70, 72, 73, 74, 75, 82, 89	60, 61, 65, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 82, 83, 89, 90, 103	60, 61, 63, 64, 65, 66, 67, 69, 70, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109	66, 77, 78, 79, 80, 81, 83, 84, 85, 86, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109
BIOMASS			111	110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122	110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122

Continued on next page

Grade Level/Subject Area Matrix

	K-3	4-6	7-8	9-12	ADULT
HYDROPOWER				123, 124, 125, 126	124, 125, 126
SOLAR THERMAL	130, 131	127, 129, 130, 131, 152	127, 129, 130, 131, 139, 140, 141, 150, 151, 152, 162, 180	127, 128, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191	130, 132, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191
PHOTOVOLTAICS				192, 193, 195, 196, 197	193, 194, 195 196, 197
GEOTHERMAL		202	202	198, 199, 200, 201, 203, 204	200, 201, 203 204
WINDPOWER			209	205, 206, 207, 208, 209, 210, 211, 212, 213 214	206, 207, 208 209, 210, 211, 212, 213, 214

LESSONS

1. Aunt Energina (K-6) Several volumes for K-3 and 4-6 feature a student comic book-workbook and can be infused into existing curriculum with little teacher preparation. Teachers guide gives basic energy information, lesson extending ideas, and sources of further information. Available free from participating utilities.

2. A Collection of Energy Conservation and Energy Management Activities (7-A) A series of lessons that evaluate electricity and water consumption, home heating and cooling, and economics. Includes student decision-making techniques. PG&E service area only. Source: PG&E.

3. Conservation I (Science Activities in Energy) (4-6) Fourteen activities and teachers guide emphasize personal energy use and present experiments involving ventilation, heat loss, simple thermostats, insulation, conserving hot water, and energy saving strategies in transportation. Source: DOE Technical Information Center.

4. Conservation II (Science Activities in Energy) (9-12) Eleven experiments with teachers guide explore insulation materials, R-value, illumination and lighting efficiency, recycling, saving hot water, and the economics of electric batteries. Teachers should be cautioned that some of the electrical connections shown are unsafe. Source: DOE Technical Information Center.

5. Conservation: Managing Our Energy Resources (EPRI Energy Reporter) (9-12) Fact sheet describes efforts being made by various consumers of electricity--as well as steps being taken by electric utilities--to save energy. Set of 35 Energy Reporters with one teachers guide free from EPRI or participating electric utilities.

6. Energy Activities for Home Economics Classes (7-12) A 105-page, easy to use teachers guide of energy conservation activities. Activities are provided in the area of housing, home management, consumer education, textiles and clothing, and food and nutrition. Source: LA Dept. of Natural Resources.

7. Energy Conservation (6-10) Six activities on conserving energy in buildings, in transportation, and in appliance use, with focus on practical skills. Teacher background, student directions, worksheets, and glossary included. Free to NY teachers through NYEEP workshops. Source: NYEEP.

8. Energy Conservation Activity Packets (ECAPS) (K-6) Activity-oriented curriculum in five volumes: K-2, 3, 4, 5, 6. Teachers guide, reproducible activity sheets, and extensive annotated bibliographies for students and teachers have made these materials basic energy teaching tools in Iowa and Nebraska. Packets focus on how students use energy, energy resources, and the reasons for energy conservation. Iowa residents only.

Source: IA Dept. of Public Instruction.

9. Energy Conservation Education: An Action Approach (4-9) Seventeen lessons ask students to both study and conserve energy in their classroom, school building, neighborhood, and home. Renewable sources, careers, and two construction projects (simple solar collector and windmill) also are presented. Each lesson includes sections for the teacher on aim, motivation, materials, development, summary, and homework assignment. Source: NY State Energy Office.

10. Energy Conservation Education for New York State (7-12) These 18 activities could be useful anywhere teachers would like to present lessons on meter reading, insulation, hot water loss, conserving gasoline, comparing energy value of different foods, etc. Each activity contains student worksheets, directions, supplementary information, and answers for teachers. A grade level/subject area matrix is included so that lessons can be located easily to fit with a current topic of study. Excellent and comprehensive activities. Source: NY State Energy Office.

11. An Energy Curriculum for the Elementary Grades (K-1) UNIT I: ENERGY AND YOU Unit introduces personal and home energy use and emphasizes the importance of conservation. One of a series of three units for elementary students. Source: IN State Dept. of Education.

12. Energy Efficient Resource Guide for Driver Educators (10-11) This resource guide contains seven units of instruction that deal with maintenance, vehicle operation, environmental conditions, traffic strategies, planning for savings, and exploiting alternatives. Iowa residents only. Source: IA Dept. of Public Instruction.

13. Energy Ingenuity (4-A) Semi-annual tabloid newsletter covers conservation and renewable topics. Includes a children's section and a list of current publications. Source: KS Energy Extension Service.

14. Fossil Fuel Junction (3-4) Unit opens with a showdown between energy conservers and energy wasters. After a thorough introduction to the fossil fuels, closes with a discussion of conservation strategies for students. Free in sponsored areas. Source: Energy Source.

15. Lessons from an Energy Curriculum for the Senior High Grades (9-12) UNIT II: ENERGY CONSUMPTION AND CONSERVATION IN THE HOME; UNIT IX: ENERGY CONSERVATION AND THE LAW Two of nine high school units that use lessons adapted from other sources to discuss conservation. Each unit is composed of several lessons that include objectives, background information, activities, and resources. Accompanied by a teachers guide. Source: IN State Dept. of Education.

16. Offalot (K) Multimedia instructional kit includes a puppet who turns things "off a lot." Emphasis on home energy users, energy conservation strategies, and safety practices. Free in sponsored areas. Source: Energy Source.

17. Project Retro-Tech (9-A) Four-volume instructional course for weatherization workers discusses conduction, infiltration, insulation and R-value, how to select appropriate weatherizing methods, and provides charts for calculating heat loss throughout a building. Teachers manual included. Source: DOE Technical Information Center.

18. Providing for Energy Efficiency in Homes and Small Buildings (9-A) Five-volume instructional unit for vo-tech classes begins with background and basic energy conservation facts, presents detailed information on heat loss and gain, estimating heating/ cooling load, efficiency of equipment and options, etc. Teachers guide included. Dated descriptions of energy production and consumption, costs, and projections, but basic lesson content is useful. Source: DOE Technical Information Center.

19. Safe Driving and Energy Conservation Through Mathematics (9-10) Unit for math and drivers education classes teaches driver safety and energy conservation while using basic math skills. Minnesota residents only. Source: MN Dept. of Education.

BACKGROUND INFORMATION

20. A Builder's Guide to Energy Efficient Homes (9-A) Discussion of various conservation strategies from a professional point of view gives more technical detail and helpful comparison than most guides for homeowners. Includes plans for energy efficient houses, sections on solar and wood heating, and complete economic and marketing analyses. Source: GA Office of Energy Resources.

21. A Checklist for Building an Energy-Efficient Home in Florida (9-A) Fact sheet lists 25 low cost and common sense steps to insure energy efficiency in new construction. Source: FL Solar Energy Center.

22. Cogeneration for Pennsylvania Business and Industry (9-A) Booklet provides a thorough overview of cogeneration: rationale, technology, federal and state policy, financing, evaluating cogenerating potential. Also lists existing cogenerators in Pennsylvania. No out-of-state bulk orders. Source: PA Governor's Energy Council.

23. CAREIRS Conservation Pack (7-A) Background information includes the newest TIPS FOR ENERGY-SAVERS from the U.S. Department of Energy, annotated bibliography on insulation, and fact sheet on indoor air pollution. Source: CAREIRS.

24. Earth-Sheltered Housing (9-A) Booklets from several sources summarize the design needs of an underground structure, advantages, and building techniques. Sources: AR Energy Office, KS Energy Extension Service, KY Energy Cabinet.

25. Energy Conservation in Agricultural Transportation (9-A) Fact sheet is concerned primarily with cutting energy use in shipping farm products to consumers. Provides an overview of energy-efficient new equipment, modifications for existing equipment, conservative driving practices, regular maintenance, and optimal shipment routing. Source: KS Energy Extension Service.

26. Energy Conservation: Technical Applications (9-A) Series of fact sheets discuss in detail several energy conservation strategies including outdoor lighting, boiler efficiency, energy management control systems, waste heat recovery, cogeneration feasibility, and automatic thermostat setbacks. Excellent charts and graphs. Residents of Ohio and its border states only. Source: OH Dept. of Development.

27. Energy Dispatch: Lighting Fact Sheet (9-A) Report reviews various kinds of lamps and suggests ways to conserve energy used for lighting. Source: IN Dept. of Commerce.

28. Energy Dispatch: Modifying Your Gas Furnace to Save Energy (9-A) Report includes an explanatory schematic that shows placement of several energy conserving retrofits discussed: automatic flue dampers, flue restrictors, furnace "derating," electronic pilot, etc. Source: IN Dept. of Commerce.

29. Energy Efficiency Needn't Cloud Your Life (9-A) Eight-panel brochure presents energy efficiency as part of the mainstream of current architectural design instead of an unestablished, uncomfortable, and expensive way to modify a home. Useful introduction to design considerations. Source: AIA.

30. Energy Efficient Sub-Division Design (9-A) Book covers the principles of energy efficiency and supplemental solar. Discusses solar access and site design from the unusual and interesting perspective of a solar developer. Source: OK Corporation Commission.

31. Energy Fact Sheet: Insulation and Cooling (9-12) Short summary presents the effects of insulation on cooling load. Includes graphs of the effect of R-value on cooling load coefficients, step-by-step explanation of how to calculate savings, and brief discussion of relative economics. Developed by the Southern Solar Energy Center. Sources: AR Energy Office, SC Energy Research and Development Center.

32. Energy Fact Sheet: Moveable Insulation (9-A) Overview presents techniques to cut conduction, convection, radiation, and infiltration through windows. Sources: AR Energy Office, SC Energy Research and Development Center.

33. Energy Patrol (K-6) Booklet presents the methods of the DeVargas Elementary School energy patrol that reduced the school's energy cost by about $1000/mo. Sample check sheets and incentives also provided. PG&E service area only. Source: PG&E.

34. Energy Savers (9-A) Booklet provides plans for school energy management and conservation programs. Includes checklists for staff, faculty, and students of ways to conserve in classes (by subject area) and work areas (cafeteria, school buses, etc.). Source: SC Energy Research and Development Center.

35. Energy Saver's Series (9-A) Produced by the Massachusetts Audubon Society, these six well illustrated, readable booklets tell a residential audience what conservation measures can be taken, how much they will cost, and how much they will save. These booklets, filled with information that could be useful to teachers and students, cover: HOW TO WEATHERIZE YOUR HOME OR APARTMENT, ALL ABOUT INSULATION, HEATING SYSTEMS MAINTENANCE AND IMPROVEMENT, ENERGY-SAVING APPLIANCES, SOLAR IDEAS FOR YOUR HOME OR APARTMENT, and FINANCING HOME ENERGY IMPROVEMENTS. Source: MA Executive Office of Energy Resources.

36. Energy Saving Ideas for Employers from the 8th Annual Energy Saver's Award of Excellence Competition (Adult) Yearly booklets intended to stimulate the exchange of ideas on energy conservation summarize each award-winning program and note the dollar amount of savings. Minnesota residents only. Source: MN Dept. of Energy.

37. Energy Survey Manual for Nonprofit Buildings (9-A) Booklet outlines an energy management plan for schools, churches, hospitals, etc. Provides form for data collection and a sequential procedure for surveying the building and pinpointing problems. Source: NJ Dept. of Energy.

38. Heat-Recovery Ventilation for Housing: Air-to-Air Heat Exchangers (9-A) Booklet teaches owner-builders, building tradespeople, and designers how to size ventilation systems for energy-efficient housing. Major emphasis is placed on the air-to-air heat exchanger. Available free from most state energy offices. Source: NCAT.

39. Home Energy Conservation (9-A) Consumer guides from a variety of sources discuss behavioral strategies and do-it-yourself retrofits to improve energy efficiency. How to find infiltration points, caulk and weatherstrip doors and windows, and install insulation are the most frequent topics covered. Sources: City of Palo Alto, CO Office of Energy Conservation, CT Energy Division, Denver Energy Resource Center, IL Dept. of Energy and Natural Resources, LA Dept. of Natural Resources, NJ Dept. of Energy, OH Dept. of Development, TVA, VT Dept. of Public Service, WY Energy Conservation Office.

40. Indoor Air Pollution (9-A) Pamphlet describes reasons for and sources of indoor air pollution. Mentions BPA research on the question and outlines energy efficient control strategies. Sources: BPA, OR Dept. of Energy.

41. Institutional Manager's Guide to Energy Conservation (Adult) Booklet describes steps to devise an energy management program, rationale for policy, and sources of additional information. Source: DOE Institutional Conservation Programs.

42. Insulation Facts (7-A) Booklet covers how insulation works, where it is needed, types of insulation, their uses and ratings, vapor barriers, and a short section on foundation insulation. Written for homeowners, but full of useful basic information. Maine residents only. Source: ME Office of Energy Resources.

43. Introducing Supplemental Combustion Air to Gas-Fired Home Appliances (9-A) Booklet shows consumers and building tradespeople how to increase heating system efficiency by using outside or supplemental combustion air and also includes a set of basic how-to instructions to allow consumers to build necessary ducts and vents. Code and safety implications of these actions are thoroughly addressed. Available free from most state energy offices. Source: NCAT.

44. Keeping Warm; Staying Cool (9-A) Two reports outline how to improve the efficiency of a space con-

ditioning system. KEEPING WARM emphasizes furnace efficiency. STAYING COOL covers natural cooling techniques, solar pool heating, and efficient air conditioning. Source: RI Governor's Energy Office.

45. Landscaping for Energy Conservation (9-A) Booklets from several sources discuss the factors affecting landscaping--winds, site topography, building orientation--and how to select local plants appropriate to these requirements. Most are region-specific. Sources: FL Solar Energy Center, IN Dept. of Commerce, KS Energy Extension Service, TVA, WY Energy Conservation Office.

46. Low-Cost Window Insulation (9-A) Booklet describes five types of window treatments, illustrates their construction, and weighs the advantages and disadvantages of each. One of a series of three on low cost, do-it-yourself solar and conservation measures. TVA area residents only. Source: TVA.

47. Major Energy Conservation Retrofits: A Planning Guide for Northern Climates (9-A) Booklet contains state-of-the-art strategies for the builder, architect, and skilled homeowner in deciding the most cost-effective procedures for insulating roofs and walls. Decision-making tool allows students to compare strategies. Available free from most state energy offices. Source: NCAT.

48. Manual for Building Energy-Efficient Homes in Louisiana (9-A) Aimed at home builders, and filled with Louisiana-specific considerations, this guidebook is an interesting and unusual presentation of energy-efficient building strategies. Text and data cover insulation, siting, glass (passive solar heating and daylighting), ventilation, heating and cooling, appliances. Limited availability outside Louisiana. Source: LA Dept. of Natural Resources.

49. Moisture and Home Energy Conservation (9-A) Booklet focuses on detecting moisture problems in the home and correcting them. Includes a training supplement on how to conduct a moisture audit in a home. Free from most state energy offices. Source: NCAT.

50. Save Ten to Forty Percent on Gasoline (9-A) Fact sheet gives detailed information on ways to increase MPG through driving techniques, trip planning, and vehicle selection and maintenance. Source: CT Energy Division.

51. The School Conservation Task Force (7-12) Booklet presents guidelines for organizing a school energy conservation program that will reduce energy consumption by at least 20 percent and instill an energy ethic in students. PG&E service area only. Source: PG&E.

52. Shading Devices; Sunscreen Shading Plans (9-A) Two booklets describe several types of exterior shading and window treatments to help cut cooling costs. Construction of each shading device is explained in concise and readable language with illustrations keyed to each construction step. One of a series on low cost, do-it-yourself solar and conservation measures. TVA service area only. Source: TVA.

53. Technical Brief: Site Planning to Reduce Energy Costs (9-A) Fact sheet developed by the Southern Solar Energy Center describes ways to prolong the seasons during which a house can be comfortable without help of the heating or cooling system, and ways to reduce the load of the system when it is in use. Source: SC Energy Research and Development Center.

54. Technical Brief: Thermal Envelope Houses (9-A) Brief report describes the basic thermal envelope design and operational characteristics. Summarizes the results of a performance monitoring study of one such house and discusses the controversy over the dynamics of air flow and heat transfer in thermal envelope housing. Good topic for science fair research. Sources: AR Energy Office, KY Energy Cabinet, VA Office of Emergency and Energy Services.

55. Total Energy Management for Schools (11-A) Materials from statewide program include a PROGRAM SUMMARY, annual summaries of AWARD WINNING PROJECTS OF MINNESOTA SCHOOLS, and a thorough energy audit manual, IDENTIFYING LOW COST ENERGY IMPROVEMENTS FOR

SCHOOL BUILDINGS, part of the Technical Assistance Service for the program. Minnesota residents only. Source: MN Dept. of Energy.

56. Water Heating Efficiency (7-A) Eight-panel brochure gives detailed instructions on "how to keep your water heating dollars from going down the drain." Describes insulating the tank, turning down the thermostat, insulating pipes, housekeeping conservation strategies, and solar and heat pump water heaters. BPA service area only. Source: BPA.

57. Window Insulation: How to Sort Through the Options (9-A) Booklet examines problem areas with the technology including choosing the right design for the window, how to choose a workable installation method, and how to size up your window insulation needs given climate, cost, and home orientation. Available free from most state energy offices. Source: NCAT.

58. Window Treatment for Energy Conservation (9-A) Fact sheet gives nontechnical discussion of most efficient use of windows for heating, cooling, ventilating, and lighting a home. Source: FL Solar Energy Center.

59. Window Treatments for Energy Efficiency (9-A) Automatic slide-tape presentation explains how windows gain and lose heat and suggests preventative strategies. Source: KY Energy Cabinet.

ENERGY EFFICIENCY AND RENEWABLES (GENERAL)

LESSONS

60. Bibliography (K-12) Sponsored by the North Carolina Alternative Energy Corporation, this annotated list describes all the energy education materials available from the lending library at the Northeast Regional Education Center in Williamston, NC. Useful source of ideas and further references. Source: NC Dept. of Public Instruction.

61. Bibliography of Free and Inexpensive Energy Education Materials; Energy Films Bibliography; Energy Angles (newsletter) (K-12) Publications of the Tennessee Energy Education Network offer further information on teaching resources. The newsletter often includes background information and teaching strategies for lessons on a specific topic. Tennessee residents only. Source: TN Energy Education Network.

62. Books on Renewable Energy for Elementary Grades (K-5) Two-page annotated bibliography current as of January 1984. Grade level of each entry noted. Source: CAREIRS.

63. Energy and Minnesota (9-12) Eight units for high school students to use in exploring Minnesota's energy future, alternatives, energy inequity, and the economics of energy decisions. Minnesota residents only. Source: MN Dept. of Education.

64. Energy Choices and Challenges (9-12) As part of a three-week unit including teachers guide, filmstrips, and pre- and post-tests, an excellent discussion of conservation resources and potential is presented. Hydro, solar, and other renewables are covered as well. Source: Energy Source and participating utilities.

65. Energy, Environment, and Outdoor Education Activities (7-12) A packet of indoor and outdoor activities focuses on renewable/nonrenewable resources; energy forms, diversity, transfer, and measurements; conservation; dependence and cooperation. Minnesota residents only. Source: MN Dept. of Education.

66. Energy, People, and the Environment (Adult) Fact sheet describing the study and compilation of a survey of energy curricula at over 25 universities across the United States. Final recommendations of this study include a detailed course structure. Source: CERES/Ball State University.

67. New and Improved Energy for Arkansas (6-9) The Arkansas Energy Office collected their fact sheets and pamphlets into a book that has been used successfully by junior high school classes as background material. Earth-sheltered houses, moveable insulation, insulation and cooling, passive solar retrofits, and natural cooling are among the topics covered. Source: AR Energy Office.

68. Mistee the Unicorn's Energy Journey (2-3) Seven sections give teacher information and student activities on solar, geothermal, wind, hydro, wood, and conservation. Incorporates home activities and is constructed for use in the West and Northwest. Source: OR Museum of Science and Industry.

69. A Portfolio of Energy Ideas: Science; A Portfolio of Energy Ideas: Social Studies (7-12) Two books of hands-on, problem-solving activities applying the basic processes of each discipline to energy topics. Minnesota residents only. Source: MN Dept. of Education.

70. Renewable Energy (6-10) Seven activities on solar, wind, biomass, and on the values and attitudes that relate to the use of renewable resources. Teacher background, student directions, worksheets, glossary. Free to NY teachers through NYEEP workshops. Source: NYEEP.

71. Renewable Energy Activities (7-12) Five activity books (32 activities in all) for general science, chemistry/physics, biology, earth science, and middle/junior high school science, complete with worksheets, teacher information, and illustrations. A sixth volume supplies background information for teachers. All were teacher-written and classroom tested. Source: NYEEP (for cost) or PG&E (service area only).

72. Renewable Energy Reading List for Young Adults (6-12) Short bibliography, current as of January 1984, lists books, pamphlets, construction plans, reports, and articles. Grade level of each entry noted. Source: CAREIRS.

73. Solar Spots (K-8) Covers solar, conservation, and wind in more than 20 infusable activities for young students. Emphasizes the need for conservation and the need to diversify our energy sources. Limited availability outside Michigan. Source: MI Energy Administration Clearinghouse.

74. Studying Arkansas' Valuable Energy (S.A.V.E.) (K-12) Curriculum in four volumes for grades K-3, 4-6, 7-9, 10-12. Each volume contains 15-20 infusable lessons drawn from many sources, that discuss primary and secondary (processed) energy, finite and renewable sources, and uses and impacts of various sources. Each lesson is structured with objectives, background information for student and teacher, and student activity sheets. The lessons are multidisciplinary and Arkansas-specific wherever possible. AR teachers only. Source: AR Dept. of Education.

75. Tennessee Energy Education Network Teacher Starter Packets (K-12) Packets of activities or lessons in energy for science, social studies, mathematics, and the elementary grades (K-3, 4-6) are drawn from a variety of sources such as Energy & Man's Environment, Solar Energy Education Project, and Energy Food, and You. Quality varies among the activities. TN residents only. Source: TN Energy Education Network.

BACKGROUND INFORMATION

76. Achieving Self-Reliance: Backyard Energy Lessons (7-12) Companion to NEW AND IMPROVED ENERGY FOR ARKANSAS, this volume encompasses a series of articles on appropriate technology projects in Arkansas. Source: AR Energy Office.

77. Alternative Energy (7-A) Booklet summarizes PG&E's research, development, and use of photovoltaics, solar thermal, windpower, cogeneration, geothermal, biomass, hydropower, and fuel cells. Brief, general information emphasizes PG&E's role; narrative accompanied by excellent system schematics and photos. PG&E service area only. Source: PG&E.

78. Appropriate Technology at Work (9-A) Highlights twenty outstanding projects funded by the U.S. Department of Energy Appropriate Technology Small Grants Program (1978-1981). These case studies make interesting reading and good models for school programs. Available free from most state energy offices. Source: NCAT.

79. Appropriate Technology Fact Sheets (9-A) Two- to eight-page reports cover a wide range of topics--designing and building a solar heated swine farrowing shed, case studies of solar and wind systems, evaluation of engines burning ethanol, municipal methane recovery, and waste to electricity conversion, for

example. All were awarded appropriate technology grants administered by the Idaho Department of Water Resources. Limited availability outside Idaho. Source: ID Dept. of Water Resources.

80. Arkansas Climate Atlas (9-A) Book gives copious data for any calculation students may need to make. Includes daily mean temperature, heating and cooling degree days, freeze data, normal precipitation, solar radiation, winds, relative humidity, cloud cover, etc. Excellent state-specific data base. Source: AR Energy Office.

81. Audubon Energy Plan Summary (12-A) Short semi-technical sketch of Audubon's two-volume plan to supply domestic energy needs in 2000 with accelerated introduction of renewable resources and conservation strategies. Source: National Audubon Society.

82. CAREIRS Kid Pack (1-12) Includes resources annotated elsewhere: SOLAR ENERGY AND YOU, LEARNING ABOUT RENEWABLE ENERGY, and reading lists for elementary grades and for high school. Source: CAREIRS.

83. CAREIRS Renewable Energy Pack (7-A) Information in this collection covers photovoltaic references, wind suitability and practicality, ethanol facts, and a general introduction to renewable resources. Source: CAREIRS.

84. The Chautauqua Notebook: Energy Saving Ideas, Vols. I and II (9-A) Brief introductions to all kinds of energy saving and converting strategies--from the familiar (wood stoves and solar water heaters) to the unusual (non-electric refrigerators and hydroponic gardening). Summaries and case studies based on the "Chautauqua" radio program. Residents of Ohio and its border states only. Source: OH Dept. of Development.

85. Consumer Information Pamphlets (9-A) Fact sheets give general reviews of topics such as conservation, insulation, trombe walls, earth-sheltered housing, etc. Some concern construction methods, others deal with generic systems and their capabilities. Of special interest to teachers is the pamphlet on how to make AN INEXPENSIVE SUNSIGHTER to determine a site's access to sunlight. Availability limited outside Idaho. Source: ID Dept. of Water Resources.

86. Earth's Renewable Resources (9-A) December 1981 issue of the EPRI JOURNAL can serve as background and reference material. Articles cover solar heating and cooling, geothermal, wind, solar thermal electric, photovoltaics, biomass, and fusion. Source: EPRI.

87. Energy Facts Series (9-A) Sixteen one- to four-page fact sheets offer brief discussions of renewable sources and conservation strategies. Some of the more unusual topics are methane production from biomass, wood gasification, solar cooking, natural cooling, and used oil recycling. Source: MO Div. of Energy.

88. Energy Hotline Fact Sheets (9-12) One- to twelve- page reports, generated by the Iowa Energy Policy Council and State Energy Extension Service, cover every area of concern in conservation and renewable resources. Iowa residents only. Source: IA Energy Policy Council.

89. EPRI Slide Library Catalog (4-A) Spiral-bound catalog presents a sampling of the Electric Power Research Institute's photo library. Renewable topics include geothermal, hydroelectric, solar heating and cooling, solar thermal, and wind. One copy of each slide free; free catalog. Source: EPRI.

90. Fact Sheets (7-A) Series of twelve range from the short and simple (on landscaping, basic conservation, and home cooling strategies) to the in-depth and complex (e.g., direct solar energy, renewable electricity, alcohol fuels, and energy from wastes). High quality background material. Source: GA Office of Energy Resources.

91. Fact Sheet Series (9-A) Overviews of many topics including: solar and wood water heating, weatherizing strategies, super-insulated and double envelope houses, active and passive solar applications, wood heat resources, and wood burning techniques. Washington residents only. Source: WA State Energy Office.

92. Future Renewable: Final Report of the Oregon Alternate Energy Development Commission (9-A) Book contains the projected energy demand and supply for Oregon through 2000, assesses the potential of renewable sources in the state, and makes lengthy recommendations. Useful for policy studies and discussion of future forecasts. Source: OR Dept. of Energy.

93. Home Energy Guide (9-A) The New Mexico version of the general energy conservation and solar applications for homes suggests ways to conserve heat, add solar heat without additional equipment, naturally cool a house, heat water efficiently and with solar, and reduce energy use for lighting and appliances. Source: NM Energy and Minerals Dept.

94. Home Made Electricity: An Introduction to Small-Scale Wind, Hydro, and Photovoltaics (9-A) Introduces the use of wind, water, and the sun as electricity producers and, based on experiences of AT grantees, helps the reader make a realistic appraisal of these systems. Excellent photographs and graphics. Available free from most state energy offices. Source: NCAT.

95. Minnesota Energy Agency Bibliographies (9-A) Two- to eight-page lists point reader to introductory books and articles found in public libraries. Topics include wood heat, solar, wind, designing and building a low-energy house, and superinsulation. Minnesota residents only. Source: MN Dept. of Energy.

96. Pennsylvania Renewable Energy Resource Assessment (9-A) Large volume is a unique atlas of energy resources. Locations, amounts, economics, and potential are described for each resource. Excellent research tool. Limited quantity available; public domain document may be reproduced. Source: PA Governor's Energy Council.

97. Renewable Energy: An Overview (9-A) Information sheet describing solar heating and cooling (active and passive systems), solar electricity, biomass resources, hydropower, and briefly, ocean energy. Sources of further information and bibliography included. Clear, nontechnical descriptions. Source: CAREIRS.

98. Report Series (9-A) Ten- to twelve-page reports cover more than 20 renewable and residential conservation topics. Series examines standard topics and some unusual ones such as: earth-sheltered and super-insulated housing, reducing moisture problems, solar site survey, heat loss calculations, and photovoltaics. Washington residents only. Source: WA State Energy Office.

99. Solar Energy in Florida (9-A) Fact sheet gives an overview of solar heating and cooling, photovoltaics, and biomass resources and applications in Florida. Source: FL Solar Energy Center.

100. Suggested Readings (9-A) Annotated bibliographies on a variety of subjects including energy education, photovoltaics, wind-generated electricity, greenhouse plans and pamphlets, superinsulation, resource recovery, and alcohol fuels. Source: NCAT.

101. Twenty Questions (9-A) Brochure on the basics of energy efficiency and solar power in buildings presented in a question and answer format. Useful overview of energy consumption and conservation in buildings. Source: AIA.

102. With Heat You Never Have to Ask Directions: An Energy Primer for Minnesota Teachers (10-A) Background source to help K-12 teachers of all subject areas become familiar with basic energy structure and language. Includes a chapter on energy efficiency and the role of conservation and alternatives in Minnesota's energy future. Minnesota residents only. Source: MN Dept. of Education.

PERIODICALS

103. Arizona Energy Education (7-A) Monthly journal covers many energy topics including solar and conservation technologies and issues. Provides background reading, examples, and statistics. Source: AZ State University.

104. The New Hampshire Sun (9-A) Tabloid newsletter on state and local renewable news and articles on renewable and conservation topics of interest. NH residents only. Source: NH Solar Energy Assn.

Biomass

105. The Solar Collector (9-A) Quarterly tabloids published separately in Georgia and Florida cover topics of interest, answer basic questions, and list courses offered by the Georgia Solar Coalition and Florida Solar Energy Center, respectively. Source: GA Solar Coalition, FL Solar Energy Center.

106. Solar Review (formerly Solar/Renewable Resources Quarterly) (12-A) Quarterly journal of the Western Interstate Energy Board highlights national and state developments in renewable energy, summarizes new issues, and offers organizational contacts. Excellent regional reference. Available in twelve Western states, Alaska and Hawaii. Source: Western Interstate Energy Board/WINB.

107. WEC Comment (9-A) Newsletter offers current news on conservation and renewables from a wide range of sources. Source: WY Energy Conservation Office.

108. Western States Energy Pipeline (12-A) Occassional issues papers anaylze current issues including renewable and conservation concerns. Available in twelve Western states, Alaska and Hawaii. Source: Western Interstate Energy Board/WINB.

109. Wisconsin Energy News (9-A) Outstanding monthly newsletter reports various energy events, emphasizes renewables and conservation, and often covers educational materials, funding, or programs. Source: WI Division of State Energy.

BACKGROUND INFORMATION

110. Bioenergy Bulletin (9-A) Bimonthly newsletter covers news and issues. BPA service area only. Source: BPA.

111. Burning Wood Better (7-A) Brochure discusses "getting the most from your wood and reducing air pollution." Colorado-specific information, but single copies available nationally. Source: Energy Resources Center of the Pikes Peak Region.

112. Central Heating with Wood or Coal (9-A) Question and answer booklet introduces the options among solid fuel heating systems, discusses components, safety factors, tax credits and recent developments in solid fuels. Source: VT Dept. of Public Service.

113. Energy Dispatch (9-A) These six- to twelve-page reports discuss central heating with wood, fireplace efficiency, purchasing wood, and wood burning water heaters. Clear, nontechnical style make these especially appropriate for classroom background reading. Source: IN Dept. of Commerce.

114. Fireplaces: Function, Use, and Maintenance (9-A) Booklet gives practical advice and physical explanations of the most effective use of fireplaces and fireplace modifications. Source: CO Office of Energy Conservation.

115. Indiana Gasohol (9-A) Brochure answer questions ranging from the definition of gasohol to its sources, characteristics as a motor fuel, effect on the corn market, price, and environmental impact. Brief but useful introduction. Source: IN Dept. of Commerce.

116. An Introduction to Biogas Production on the Farm (9-A) Introduces farm-size biogas production and includes a brief discussion on how to evaluate the biogas production potential of a specific ranch or farm. Available free from most state energy offices. Source: NCAT.

117. Look Where Our Corn Goes (9-A) 24-page brochure describes corn processing and its products: fuel alcohol, gluten feed, corn oil, and carbon dioxide. Source: Renewable Fuels Association, Archer Daniel Midland Co.

Hydropower

118. Safe and Warm Wood Heat (9-A) Substantial reports from a variety of sources, each with their own title, provide detailed information on buying, installing, operating, and cleaning a wood heater. Many also cover locating, cutting, and burning wood. All emphasize safety and many include a reference list. Sources: CT Energy Division, DE Energy Office, IN Dept. of Commerce, ME Office of Energy Resources, MN Dept. of Energy, NM Energy and Minerals Dept., RI Governor's Energy Office, TVA.

119. Service in Action (9-A) This fact sheet series covers selecting a wood stove, stove operation and safety, wood fuel (heating value, seasoning, etc.), and hints for safe harvest of fuelwood. Source: CO Office of Energy Conservation.

120. Wastes to Resources: Appropriate Technologies for Sewage Treatment and Conversion (9-A) Book presents background information on conventional and alternative sewage treatment in the U.S. and the key issues facing municipal sewage managers. Uses case studies and excellent graphics to illustrate main points. Available free from most state energy offices. Source: NCAT.

121. Western Regional Agricultural Engineering Service Fact Sheets (9-A) Seven fact sheets cover fuelwood facts, burning wood introduction, wood heating cost comparison with fossil fuels and electricity, wood stove installation safety checklist, wood stove selection, and improving fireplace efficiency. Source: OR Dept. of Energy.

122. Wood is Good (9-A) Paper discusses use of waste wood for industrial and utility steam/power generation, and includes a discussion of economic, environmental, and energy independence benefits. Source: National Wood Energy Association, Ultrasystems, Inc.

123. Electricity from Water: Hydroelectric Power (EPRI Energy Reporter) (9-12) Fact sheet explains how hydroelectric dams and pumped storage facilities work. Discusses current interest in this technology. Set of 35 Reporters with one teachers guide available free from EPRI or participating electric utilities.

124. Hydroelectric Power (EPRI Energy Researcher) (9-A) Short informational publication presents pros and cons of small and large hydroelectric plants. Examines pumped storage technology and surveys research underway to increase hydro's contribution to the energy mix. First 100 free. Source: EPRI.

125. Micro-Hydroelectricity for the Southeastern United States (9-A) Booklet discusses the advantages and constraints of developing and using micro-hydropower. Source: KY Energy Cabinet.

126. Small Dam Survey (9-A) Four-page report gives statewide inventory of undeveloped and partially developed hydropower sites that could generate up to 300 megawatts of electricity. Source: AR Energy Office.

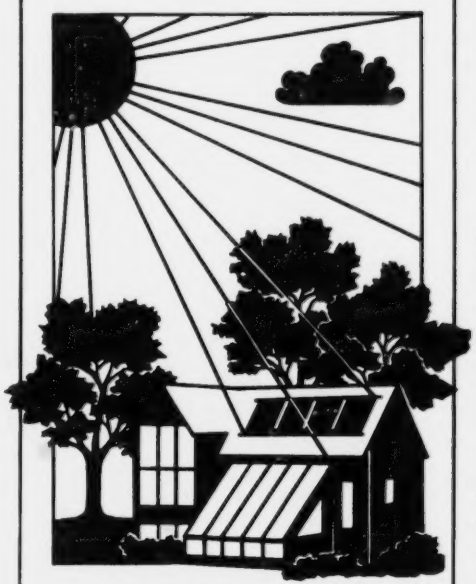
LESSONS

127. Bright Ideas (6-12) Tabloid newsletter published six times each school year covers one solar concern, technique or concept in each issue. Supporting classroom experiments and activities and a materials review section also appear in each edition. Recent issues have discussed economics, shading and landscaping, adobe, cooking, and photovoltaics. Source: AZ Solar Energy Commission.

128. Lessons from an Energy Curriculum for the Senior High Grades (9-12) UNIT IV: FOSSIL FUELS AND ENERGY ALTERNATIVES One of nine high school units that use lessons adapted from other sources, this unit emphasizes coal and solar. Each lesson includes objectives, background information, activities, and resources. A teacher's guide accompanies the unit. Source: IN State Dept. of Education.

129. Solar Energy and You (4-8) Fact sheet discusses basic active and passive solar heating, home heating, solar energy storage in clear, nontechnical language. Concludes with reading comprehension questions, questions to guide further research, and a short discussion of heat transfer. Source: CAREIRS.

130. Solar Energy Audio-Visual Materials (K-A) 24-page annotated film and videotape list notes grade level for most entries. Updated December 1983. Source: CAREIRS.



131. Solar Energy Educator (K-12) Tabloid newsletter provides current solar energy information, teaching materials and resources. Two inside pages are devoted to classroom activities, one page for elementary and one for secondary classes. Funded by NM Energy Research and Development Institute, NM Energy and Minerals Dept., and U.S. Dept. of Energy. Source: NM Solar Energy Institute.

132. Solar Heating and Cooling (EPRI Energy Researcher) (9-A) Fact sheet discusses various solar heating and cooling strategies and their impact on electric utilities. First 100 free. Source: EPRI.

133. Solar Heating and Cooling: Energy from the Sun (EPRI Energy Reporter) (9-12) Fact sheet describes active and passive solar heating and cooling systems and discusses the impact of their use on an electric utility. Set of 35 Reporters with one teachers guide free from EPRI or participating electric utilities.

134. Solar Science Projects for Georgia High School Students (9-12) Eight self-directed experiments for high school students with illustrations. Georgia residents only. Source: GA Solar Coalition.

BACKGROUND INFORMATION

135. Arkansas Energy Future: Solar Energy (9-A) 72-page booklet covers the basic concepts and appli-

cations of solar energy for space conditioning and photovoltaic electricity. Discusses solar ponds, taxes, economics, financing, and solar's relationship to conservation. Includes interesting profiles of PV-powered college in Mississippi County, AR and solar-cooled multi-family housing project in Conway, AR. Source: AR Energy Office.

136. Arkansas Energy Future: Solar Greenhouses (9-A) 40-page pamphlet covers the basic greenhouse principles and components-design, glazing, insulation, storage, ventilation--and notes good construction and gardening practices. Source: AR Energy Office.

137. Building and Using the Solar Greenhouse (9-A) Booklet gives passive solar principles, greenhouse design planning steps and materials, and greenhouse operation recommendations. Includes sections on pests and diseases, and greenhouse savings. Source: AL Solar Energy Center.

138. Build-It-Yourself Solar Water Heater (9-A) Booklet guides the handy person through building a breadbox water heater. Lists of materials, well-organized instructions, and illustrations make it an easy to use manual. One of a 3-part series on low cost, do-it-yourself solar and energy conservation systems. TVA service area only. Source: TVA.

139. CAREIRS Consumer Pack (7-A) Several fact sheets thoroughly discuss converting a home to solar heat, planning the design, installation, and upkeep of solar space or water heating systems, and climate fundamentals (incident solar radiation, degree days, micro-climate of a site). A general Q&A discussion is included also. Source: CAREIRS.

140. CAREIRS Domestic Hot Water Pack (7-A) Collection of background materials includes an annotated bibliography and discussion of solar hot water basics: components, systems types, site assessment, collector location, and installation tips. Source: CAREIRS.

141. CAREIRS Passive Pack (7-A) Collection of background materials includes information on passive design principles, sunspaces and solar greenhouses, low cost passive retrofits, and passive cooling strategies. Source: CAREIRS.

142. City of Santa Clara Solar Projects (9-A) Booklet on two of the largest solar heating/cooling systems in the country, installed in municipal facilities by the City of Santa Clara. Flyer and several articles describing the solar utility program also available. Source: City of Santa Clara.

143. Do-It-Yourself Solar Construction Manual (9-A) One manual on thermosiphoning air panels, and another on solar hot water systems give easy to follow directions accompanied by copious drawings. No out-of-state bulk orders. Source: VT Dept. of Public Service.

144. Drying Wood with the Sun: How to Build a Solar-Heated Firewood Dryer (9-A) Shows the over 15 million firewood users in the U.S. how to build an efficient, low cost firewood dryer. Contains suggestions for more efficient burning of the dry wood and plentiful drawings and diagrams. Available free from most state energy offices. Source: NCAT.

145. Energy from the Sun: Practice and Applications (9-A) Book provides an excellent introduction to terms, components, and functions of various active and passive solar systems. Readers are escorted through various calculations, and the text uses graphs and tables advantageously. Sections on economics and tax incentives are dated, but generally the text is very useful. Source: KS Energy Extension Service.

146. Evaluating Passive Solar in Wisconsin (9-A) Presents information on system components, design factors, energy performance, and cost effectiveness of passive solar heating in Wisconsin. Includes knowledge gained from demonstration projects supported by the Division of State Energy. Source: WI Div. of State Energy.

147. Idaho Solar and Weather Information (9-A) Published in response to a need for reliable data on climate and solar radiation, this book gives region-specific detailed monthly amounts of direct and diffuse insolation for various tilt angles, and

cites average temperatures, degree-days, humidity, and wind speeds and directions. Out-of-state availability limited. Source: ID Dept. of Water Resources.

148. The Idaho Sunspace Handbook (9-A) This volume is both a guide for the do-it-yourself crowd and a regionalized text on the principles of passive systems. Includes an extensive glossary. Out-of-state availability limited. Source: ID Dept. of Water Resources.

149. Installation Guidelines for Solar DHW Systems (9-A) Manual for amateur builders is stuffed with diagrams, charts, photos, and schematics. Good resource for those who want all the details. Out-of-state availability limited. Source: ID Dept. of Water Resources.

150. An Introduction to Passive Solar Energy (7-A) Published by Pacific Power and Light, this 8-page booklet summarizes heat transfer mechanisms, passive solar options (including energy conservation requirements and retrofitted greenhouses), history and other sources of information. Source: OR Dept. of Energy.

151. Introduction to Solar Greenhouses (7-A) Booklet is a pictorial primer on the basic components of constructing a sunspace. Opening volume to SUNSPACE CONSTRUCTION DETAILS and SUNSPACE OPERATIONS. TVA service area only. Source: TVA.

152. Kentuckians Are Building with Passive Solar (6-A) Automatic slide-tape presentation explains passive solar concepts using passive solar homes in Kentucky as examples. Source: KY Energy Cabinet.

153. Living in the Sun (9-A) Book combines narrative on the principles and feasibility of solar in "cold, cloudy Vermont" with case studies of four different types of passive solar systems. Includes non-residential systems and considers retrofits as well as new construction. Source: VT Dept. of Public Service.

154. Low Cost Solar (9-12) Booklet explains and gives simple directions for constructing a breadbox water heater, solar wall heater, rigid moveable window insulation, and sunscreens. Excellent, clear illustrations. Designed primarily for low income and elderly audiences. TVA service area only. Source: TVA.

155. Mazria's Passive Solar Design Rules of Thumb Adapted for Minnesota Climate (9-A) Outline separates rules into three groups: building shape and position on site; design details; and efficiency rules. Source: MN Dept. of Energy.

156. Natural Cooling Decision Guide (9-A) Thirty-page booklet provides the information and tools needed to evaluate and select practical natural cooling strategies specific to the Tennessee Valley climatic regions. Covers annual kilowatt-hour savings, comfort, ways to lower cooling costs, identifying and preventing heat gains, ventilation, and efficient use of air conditioning, among other topics. TVA service area only. Source: TVA.

157. Oregon Solar Energy Directory (9-A) Report is aimed at consumers, but includes a section on periodicals, information centers, and citizen groups in Oregon that offer solar information. Source: OR Dept. of Energy.

158. Passive Cooling Ideas for the Southeast (9-A) Fact sheet discusses siting considerations, landscaping, ventilative and convective cooling, heat gain prevention, night sky cooling. Reminds readers of historic use of passive cooling techniques. Source: FL Solar Energy Center.

159. Passive Solar Design Handbook (9-A) Book offers a complete and well-organized discussion of passive solar technologies. Begins with an outline of solar radiation, density, sunpaths, heat transfer, and storage. Includes excerpts from Mazria's Passive Solar Energy Book. BPA service area only. Source: BPA.

160. Passive Solar for Today's Market (9-A) Prepared by the Mid-Atlantic Solar Energy Association, this hefty volume covers everything passive--from definition, physics of heat, and anatomy of a system to economics, construction, and performance. Lots of illustrations make the text clearer still. Source: PA Governor's Energy Council.

161. Passive Solar Greenhouse: Design and Construction (9-A) Spiral-bound book covers design theory and construction of sunspaces or greenhouses. Includes chapters on calculations (heat loss and gain, heating load, etc.) and greenhouse management. Residents of Ohio and its border states only. Source: OH Dept. of Development.

162. Passive Solar New Construction for Rhode Island (7-A) Amalgamates CAREIRS fact sheets on passive solar and adapts them to Rhode Island. Clear discussion of passive fundamentals, useful to students in middle school or above. Source: RI Governor's Energy Office.

163. Putting the Sun to Work (9-A) Three-volume series on solar energy use in buildings, these books cover "direct" solar (active and passive space conditioning), wood burning, and renewable electricity. Systems are compared to each other and their usefulness in Georgia is rated. Source: GA Office of Energy Resources.

164. Seasonal Sun and Home Orientation (9-A) Brochure presents a semi-technical discussion of sun angles and summarizes the building orientation, shape, roof angle, and other features of a solar home. TVA service area only. Source: TVA.

165. Setting Your Sights on the Sun (9-A) Book provides complete background on passive and active solar applications and how to determine which option is appropriate in Palo Alto. Availability limited outside city. Source: City of Palo Alto.

166. Sizing Fixed Overhangs for Solar Collectors (9-A) Pamphlet describes solar angles, shading needs, and the conjunction of the two. Supplies a graph with which to calculate the required size and placement of an overhang. Source: KS Energy Extension Service.

167. Solar Collector Types and Components (9-A) Fact sheet describes flat plate, evacuated tube, and concentrating collectors. Source: CAREIRS.

168. Solar Domestic Hot Water (9-A) Reports, fact sheets, and books from various sources describe types of systems, economics, sizing, performance, pay-back, maintenance requirements, and consumer tips. Sources: AR Energy Office, City of Palo Alto, DE Energy Office, Denver Energy Resource Center, FL Solar Energy Center, ID Dept. of Water Resources, KS Energy Extension Service, KY Energy Cabinet, NY State Energy Office, TVA.

169. Solar Energy: Bright Spot on San Diego's Horizon (9-A) Colorful booklet considers the components and basic functioning of solar pool heating, domestic water heating, and space conditioning. Also lists solar ordinances in San Diego, describes San Diego Gas and Electric's travelling solar exhibit, and notes SDGE's ongoing solar system performance monitoring. Emphasizes SDGE's efforts, but is informative as well. Source: SDGE.

170. Solar Energy: Let's Talk Dollars and Sense (9-A) Brochure gives a summary of costs and benefits of seven kinds of solar/conservation retrofits. Possible savings and comparison with return from other kinds of investment are especially interesting. Colorado-specific information. Source: Energy Resources Center of the Pikes Peak Region.

171. Solar Fact Sheets (9-A) Several information series offer general orientation, discuss conversion system types, performance and costs, and/or give how-to guidance and consumer tips. Sources: AR Energy Office, City of Palo Alto, CO Office of Energy Conservation, IL Dept. of Energy and Natural Resources, KY Energy Cabinet, ME Office of Energy Resources, MN Dept. of Energy, OH Dept. of Development, OR Dept. of Energy, WI Div. of State Energy.

172. Solar Flat Plate Collectors: Which One for You? (9-A) Booklet walks the reader through comparative calculations of thermal efficiency energy value, explains SEIA certification ratings, and poses questions to determine the overall worth of any collector. Source: WI Div. of State Energy.

173. Solar Greenhouses and Sunspaces: Lessons Learned (9-A) Booklet focuses on the experiences of hundreds of DOE grantees who designed and built greenhouses. Examines indivi-

dual greenhouse components, including framing, glazing, storage, ventilation, and control mechanisms. Question and answer format makes easy reading, and case studies yield some definitive modifications to popular solar wisdom. Available free from most state energy offices. Source: NCAT.

174. Solar Heating of Swimming Pools: A Question and Answer Primer (9-A) Fact sheet covers costs, types, siting, performance, and lifetimes of several types of collectors. Source: FL Solar Energy Center.

175. Solar Overviews (9-A) Booklets discuss the basic principles of active and passive solar heating and cooling systems, their economics, advantages, and disadvantages. Sources: American Solar Energy Society, NJ Dept. of Energy, NM Energy and Minerals Dept., TVA.

176. Solar Lumber Kilns: Design Ideas (9-A) One of several reports on specific solar applications this booklet presents the pros and cons of drying lumber with solar energy. Many illustrations and discussion of solar principles as they apply to kiln design and construction. Source: NM Energy and Minerals Dept.

177. Solar Resource Manual for Iowa Secondary School Teachers (9-12) Guide provides a comprehensive interdisciplinary approach to teaching about active and passive solar energy concepts. The manual includes a number of other solar resource materials available to educators. Iowa residents only. Source: IA Dept. of Public Instruction.

178. Solar Sunrooms and Greenhouses: Design and Construction; Trombe Walls: Low Cost Solar Heating (9-A) Two 2-page guides that examine systems and their justifications. Source: Denver Energy Resource Center.

179. Solar Wall Heater Planbook; Solar Breadbox Water Heater Planbook (9-A) Two do-it-yourself manuals provide detailed directions for building and installing each component of the system. Short product guides and materials lists are included. Source: GA Office of Energy Resources.

180. Solar Water Heating in Wisconsin: Is It for You? (8-A) Booklet uses a unique series of data worksheets to compute cost of water heating with fossil fuels, annual fuel cost after conservation, feasibility of solar water heat in terms of physical size and payback period. An interesting set of exercises. Source: WI Div. of State Energy.

181. Solar Water Heating Options in Florida (9-A) Fact sheet describes direct and indirect pumped systems, thermosiphons, breadboxes, and phase change systems. Source: FL Solar Energy Center.

182. South Carolina Passive Solar Home Design (9-A) Manual covers passive solar principles modified by the climate of South Carolina. Emphasizes cooling and includes a helpful list of most commonly made mistakes. Source: SC Energy Research and Development Center.

183. Sunspace Construction Details (9-A) Booklet describes the elements needed to build a sunspace (lumber, insulation, weatherstripping, caulking, glazing, ventilation, thermal mass, shading) and includes charts for comparing the options. Detailed plans for building three different sunspaces are given. TVA service area only. Source: TVA.

184. Sunspaces for South Carolina: Principles and Construction of a Passive Solar Greenhouse (9-A) Booklet offers excellent and complete coverage of passive basics, solar energy in the Southeastern U.S., construction needs and processes, and three pre-packaged designs. Charts and text accompany reader through necessary calculations. Source: SC Energy Research and Development Center.

185. Sunspaces for the Southeastern United States (9-A) Booklet covers the principles and construction of passive solar greenhouses. Source: KY Energy Cabinet.

186. Sunspace Operations (9-A) Booklet gives step-by-step guidance to operating and maintaining sunspaces. Directions are keyed to the purpose of the sunspace--for heat, living space or plants. Includes troubleshooting checklist. Companion to SUNSPACE CONSTRUCTION DETAILS. TVA service area only. Source: TVA.

Photovoltaics

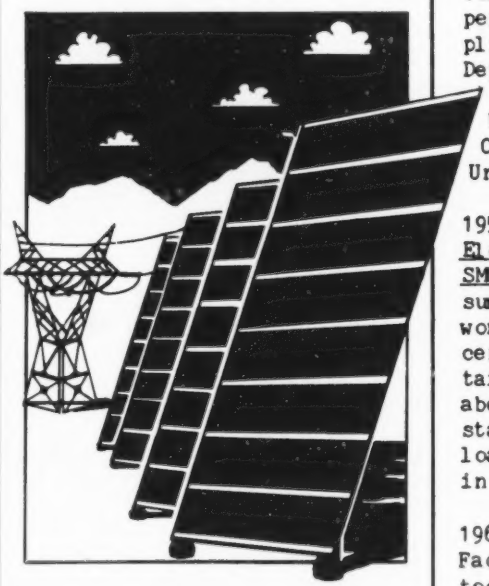
187. Technical Brief: Batch Water Heaters (9-A) Fact sheet discusses the characteristics of these low cost solar hot water systems. Describes system components and how to assemble them. Source: AR Energy Office.

188. Technical Brief: Designing the Passive Sunspace (9-A) Brief report defines the principles and functioning of a solar greenhouse and offers guidance for their sizing and design. Sources: AR Energy Office, KY Energy Cabinet.

189. Technical Brief: Direct Gain Systems (9-A) Fact sheet describes the basic function of the window and thermal mass of this passive solar system, compares storage media, and provides simplified design and sizing guidelines. Sources: AR Energy Office, KY Energy Cabinet.

190. Water Heater Options: Heat Pump and Solar Alternatives in the Pacific Northwest (9-A) Booklet suggests ways to conserve hot water, discusses the fundamentals of heat pump and solar DHW systems, and estimates annual savings in the Northwest. BPA service area only. Source: BPA.

191. Which Sunspace for You? (9-A) Booklet defines sunspaces, discusses the principles of operation, and describes the purposes they can fill. Also summarizes construction and materials concerns and refers reader to more detailed materials. TVA service area only. Source: TVA.



192. Electricity from the Sun: Technology for Solar Power (EPRI Energy Reporter) (9-12) Fact sheet discusses solar thermal power conversion, photovoltaics, and the role of solar electricity in the overall electric supply picture. Set of 35 Reporters with one teachers guide free from EPRI or participating utilities.

193. Energy Fact Sheet: Photovoltaics (9-A) Provides brief answers to the most frequent questions on the photovoltaic effect, uses of PV's, costs, and their future. Developed by the Southern Solar Energy Center. Sources: KY Energy Cabinet, SC Energy Research and Development Center.

194. Photovoltaic and Passive Solar Lab Activities for Applied Solar Energy Courses (Adult) Fact sheet describes the study and development of laboratory experiments used in the Applied Solar Program of the Department of Physics and Astronomy at Ball State University. Source: CERES/Ball State University.

195. Photovoltaic Power: Electricity from the Sun, SMUD PV1 (9-A) Program summary outlines the world's first commercial central station photovoltaic power plant. Details about the one megawatt installation and its peak load advantages are covered in depth. Source: SMUD.

196. Photovoltaics (9-A) Fact sheet describes PV technology, system requirements for various purposes, economics, and applications. A summary discussion that assumes some background on the photovoltaic effect and electrical principles. Source: SDGE.

197. Photovoltaics: A Question and Answer Primer (9-A) Fact sheet covers how PV's work, how cells are made, costs, applications, present status, and future potential. Source: FL Solar Energy Center.

Geothermal

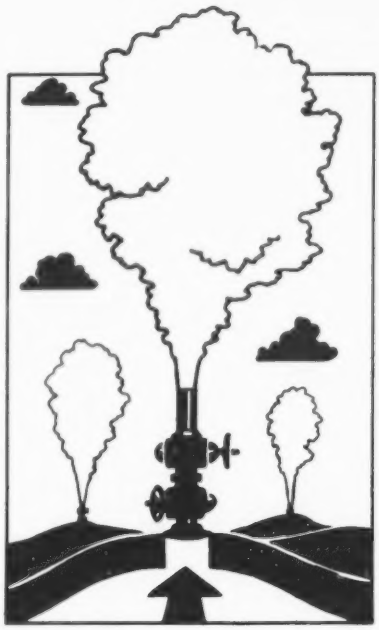
198. Electricity from the Earth: Geothermal Energy (EPRI Energy Reporter) (9-12) Fact sheet describes three kinds of geothermal energy--hydrothermal, geopressured, and petrothermal. Also discusses methods of harnessing each. Set of 35 with one teachers guide free from EPRI or participating electric utilities.

199. Geothermal Energy (EPRI Energy Researcher) (9-12) Non-technical report discusses geothermal potential. First 100 copies free. Source: EPRI.

200. Geothermal Energy (9-A) Two different booklets, one 12-page, one 36-page, feature beautiful photographs to illustrate basic geothermal principles and production. Union Oil's role is emphasized and international geothermal development is included. Source: Union Oil.

201. Steam Power Is Rising (9-A) Program summary of SMUD's geothermal installation only skims general information on geothermal energy; but facts about this particular power plant are plentiful. Source: SMUD.

202. The Story of Geothermal Energy (5-8) Large, colorful poster diagrams



the way geothermal heat is made within the earth and is tapped by modern technology. Short explanatory text and illustrative photos accompany the primary diagram. Emphasizes Union Oil's involvement. Source: Union Oil.

203. Technical Brief: Earth Cooling Tubes (9-A) Describes how earth cooling tubes function and highlights some design problems--high humidity, odor, and noise--that require special attention. Source: SC Energy Research and Development Center.

204. Using the Earth to Heat and Cool Homes (9-A) Book focuses on installation, economics, reliability, and performance of systems using low-grade geothermal energy and earth-tempered air systems. Includes sections on lessons learned, common questions, and sources of help. Available free from most state energy offices. Source: NCAT.

Wind

205. Electricity from the Wind: New Use of an Old Source (EPRI Energy Reporter) (9-12) Fact sheet discusses resources, siting, kinds of turbines, and economics of electric power production from wind. Set of 35 with one teachers guide free from EPRI or participating electric utilities.

206. Estimating SWECS Energy Production (9-A) Accompanied by paragraphs of cautions and caveats, this 3-page report offers a five-step calculation to estimate energy production from a small wind energy conversion system. Source: OR Dept. of Energy.

207. Evaluating Wind Energy Potential in Louisiana (9-A) This report presents a methodolgy for assessing the onshore potential of the wind as a source of energy in Louisiana. Source: LA Dept. of Natural Resources.

208. Interim Report on Wind Energy in Arkansas (9-A) Paper gives wind speeds and measurements for a wind prospector in the state. Wind patterns in Arkansas are discussed and charted. Source: AR Energy Office.

209. An Introduction to Wind Energy (7-A) 24-page booklet, published by Pacific Power and Light, concentrates on private wind energy conversion systems with their own storage and back-up. Also lists manufacturers of wind system components. Source: OR Dept. of Energy.

210. Kansas Wind Energy Handbook (9-A) Book is a thorough, modern tool to extend the long history of wind conversion in Kansas. Leads the reader from resource analysis and site selection to machine selection and installation. Excellent charts and graphs. Source: KS Energy Extension Service.

211. Mechanical Water Pumping Windmills Information Packet (9-A) Fifty pages offer solid background material on maintaining the classic multi-vane windmill of the Plains, designing and siting low-pressure water systems, a historical reading on wind-driven irrigation, technical discussion of mechanical load estimation, and spec-sheets on a variety of water pumping machines. Source: OR Dept. of Energy.

212. Siting Small Wind Machines (10-A) 12-page report reveals the procedures and pitfalls of selecting a wind conversion site and characterizing the wind resource available there. Residents of Ohio and its border states only. Source: OH Dept. of Development.

213. Small Wind Energy Conversion Systems (9-A) Book is designed as a practical guide for installing a small wind energy system. As such, it gives thorough attention to evaluating a site's resource potential, energy requirements, types of systems, their costs and components. Also lists manufacturers, references, and maps wind speeds in the Northwest. BPA service area only. Source: BPA.

214. Wind Fact Sheets (9-A) Minnesota-specific materials discuss basic resource and conversion issues. Titles in this series are: WIND ENERGY IN MINNESOTA, WIND ENERGY APPLICATIONS, WIND SITE MONITORING, WIND ECONOMICS, BIBLIOGRAPHY, and SMALL CONVERSION SYSTEM DEALERS. Minnesota residents only. Source: MN Dept. of Energy.

Sources

Alabama Solar Energy Center
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American Gas Association
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EEI is the trade association for private power companies. The organization has a variety of printed materials on issues of interest to utilities and consumers.

Environmental Action Foundation (EAF)
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EAF maintains a network of citizen activists concerned about utility issues and publishes the bi-monthly Power Line *as well as a series of reports on the electric utility industry.*

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Interstate Solar Coordination Council (ISCC)
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A 50-state organization including members from the Bonneville Power Administration and the Tennessee Valley Authority. ISCC also develops and coordinates standards for solar energy products.

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The Foundation is the educational arm of the Solar Energy Industries Association (SEIA), which represents the manufacturers and distributors of low-, medium-, and high-temperature solar thermal equipment and photovoltaics. SEIA has twenty affiliated state chapters.

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An integrated company that develops, manufactures and markets hot air systems for space heating and hot water.

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Center for Renewable Resources Publications List

Educational Affiliate of the Solar Lobby

SPECIAL REPORTS

Renewable Energy at the Crossroads

by Christopher Flavin

A 24 page factual report dramatically outlining the contribution—and potential—of conservation and renewable energy technologies to the nation's energy mix.

Electricity: New Consumer Choices

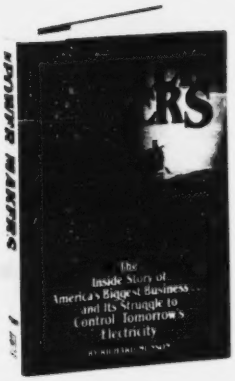
by Richard Munson

A concise report providing surprising new data on competition in the electrical industry from small power producers using renewable energy technologies and other decentralized power technologies.

Alternative Energy: A Guide to Free Information for Educators

by Janet White

A list of free sources of information on energy efficiency and renewable energy technologies for use by educators and energy policy makers to encourage debate on realistic energy options.

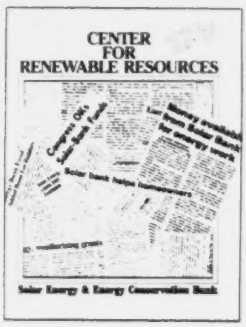


NEW BOOK

Power Makers

by Richard Munson

This book traces the electric utilities' rapid growth from Thomas Edison's experiments in 1879 to the first major nuclear accident at Three Mile Island in 1979. It describes how sweeping reforms must transfer fortunes, shift employment patterns, and alter the way Americans produce energy *(bookstore price $16.95)*.



Public Clearinghouse Series

The first state-by-state guide in the Public Clearinghouse Series provides information on the Solar Bank and how to obtain loans and grants for home weatherization and solar installations. It identifies progress in each state as well as those states which have elected not to participate in the program.

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